EARTH SCIENCES (M.S.)

https://ceps.unh.edu/earth-sciences/geochemical-systems-specialization-ms

Description

The department of Earth Sciences offers a Master of Science degree with a specialization in Geochemical Systems. This program is intended for students with interests in all aspects of geochemistry: bedrock, sediment, water, ice, and air with particular emphasis on interpreting and modeling the interaction of these media (e.g., biogeochemistry, air quality, and climate change).

Requirements

Admission Requirements

An applicant to the M.S. program is expected to have demonstrated competency in the following college courses: one year each of calculus and chemistry and two semesters of physics and/or biology. In addition, the applicant is expected to have an undergraduate degree or equivalent in geology, chemistry, physics, mathematics, computer science, engineering, or the biological sciences. Students lacking some background in a particular area may be admitted provided they are prepared to complete courses, without graduate credit, in which they may be deficient. The program of study a student wishes to follow and the student's undergraduate major determine the level of preparation necessary. The preparation of each student is determined before the beginning of the first semester in residence in order to plan the course of study. Each entering student is assigned an academic adviser to assist in planning a program of study.

Degree Requirements

Students in the thesis option must satisfactorily complete at least **30 graduate credits**, which include the credits accumulated in the core curriculum. Students in this option must complete a master's thesis (6 credits) and give an oral presentation of the results.

Students in the non-thesis option must satisfactorily complete at least **34 graduate credits**, which includes the core curriculum, a 2–credit directed research project (ESCI 898 Directed Research), and a written and oral presentation of that research.

Geochemical Systems Specialization

The core curriculum for the specialization in geochemical systems normally includes:

Code	Title	Credits
Required Courses:		
ESCI 997	Seminar in Earth Sciences (first year)	1
ESCI 998	Proposal Development (first year)	1
Select three of the following courses:		**9-12**
ESCI 841	Geochemistry	
ESCI 845	Isotope Geochemistry	
ESCI 847	Aqueous Geochemistry	
ESCI 852	Chemical Oceanography	
ESCI 896	Topics (Biogeochemistry)	
or NR 844	Biogeochemistry	
Select Master's Thesis or Directed Research:		
ESCI 899	Master's Thesis (6 credits)	
ESCI 898	Directed Research (2 credits)	

Degree Plan

Course	Title	Credits
First Year		
Fall		
Core Curriculum 1 Course		4
Elective I Course		3-4
ESCI 997	Seminar in Earth Sciences	1
	Credits	**8-9**
Spring		
Core Curriculum 2 Course		4
Elective 2 Course		3-4
ESCI 998	Proposal Development	1
	Credits	**8-9**
Second Year		
Fall		
Core Curriculum 3 Course		3-4
ESCI 899	Master's Thesis (or Elective for Directed Research Option)	3-4
	Credits	**6-8**
Spring		
Elective 3 Course		3-4
ESCI 899 or ESCI 898	Master's Thesis or Directed Research	2 or3
	Credits	**5-7**
	Total Credits	**27-33**

Student Learning Outcomes

Students graduating with a MS in Earth Sciences (Geochemical Systems specialization) should achieve the following learning outcomes:

Core Knowledge

- Demonstrate a foundation of knowledge in Geochemical Systems that results in expertise and an understanding of the chemistry and chemical interactions of the Earth's mantle, crust, or on the surface of the Earth in terrestrial, aquatic, or atmospheric environments at a range of timescales focused on, for example, biogeochemical processes that govern the distribution and cycling of elements and nutrients, processes that add and remove elements in various environments, or the chemical transformations and exchanges between the atmosphere, oceans, and solid Earth.
- Demonstrate specialized knowledge of a field within geochemical processes and elemental cycles on Earth sufficient to conduct substantive supervised research.
- Demonstrate basic knowledge of how the processes within this field interact with other related disciplines.

Research Methods and Analysis

- Identify and demonstrate knowledge of a range of qualitative and quantitative methodologies typically used in geochemistry research.

- Discover and critically read published research in the Earth sciences and related fields of mathematics, statistics, physics, chemistry, and biology.
- Frame empirical research and/or theory guided by prior knowledge.
- Implement a rigorous study using appropriate methods, measures and techniques.
- Critically evaluate and systematically analyze data to reach appropriate findings and interpretations

Scholarly Communication

- Structure a coherent argument that rigorously presents and evaluates evidence to support claims.
- Review and cogently synthesize relevant literature.
- Write at a level and in a style of English consistent with that found in leading academic journals.
- Understand and properly use styles of citing, referencing, and formatting found in leading academic journals.
- Clearly convey research findings through oral presentation supported by appropriate digital media.
- Cogently summarize research and its significance to non-specialist audiences.

Professionalism and Pedagogy

- Prepare manuscripts that meet the standards of academic and research journals and respond appropriately to recommendations for revision.
- Demonstrate collaboration, leadership and teamwork.
- Create a welcoming environment that is supportive, inclusive and equitable.
- Make effective contributions to university, community and professional service.
- Communicate effectively to groups in a lecture format.